

## ABSTRACT OF THE DISCLOSURE

A sensor enables simultaneous or sequential eddy current and optical reflectance measurements of conducting film by providing an eddy current inspection coil and a first and a second optical fiber extending axially through the coil. The eddy current inspection coil is excited by a radio frequency generator and induces eddy currents in the conducting film which are sensed using a detector. The conducting film is illuminated by a first optical fiber, and light which is reflected from the conducting film is transmitted by a second optical fiber to a detector. In the case of opaque conducting films, the eddy current sensor measures sheet resistance which is determinative of film thickness. In opaque conducting films, optical reflectance measurements are indicative of characteristics such as grain size and surface oxidation. Eddy current sensing is indicative of sheet resistance which correlates to grain size and film thickness. By providing both optical reflectance and eddy current sensing measurements, conducting film thickness may be accurately determined. Optical reflectance measurements may be used to determine thickness of dielectric films and transparent or semi-transparent conducting films directly. The combined use of electrical and optical reflectance signals provides a single probe unit that measures both dielectric and conducting transparent and semi-transparent films.